

Southern Pine Beetle Management

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We've all seen it—those once lovely pine stands that have become little more than dead or dying snags. Lack of proper management causes thousands of productive acres to fall prey to the state's number one forest predator—insects and disease! Let's get acquainted with one of the most common pests in Alabama.

The southern pine beetle (SPB) is the most destructive insect pest of pine forests in Alabama. The beetle ideally represents the definition of its genus—killer of trees! The southern pine beetle is a small, cylindrical insect about 1/8" long and brown to black in color. All life stages (egg, larva, pupa, and adult) occur in or under the bark of infested pines.



SPB can have up to seven generations per year in Alabama. Adult beetles kill pines by attacking the main bole of the tree. The first signs of attack are popcorn-size lumps of pitch called "pitch tubes," which occur at heights up to 60 feet. During dry weather, pitch tubes may not appear; instead, red boring dust, which looks like fine sawdust, will collect in bark crevices and in spider webs along the base of the pine.

In later stages of southern pine beetle attack, you will be able to see small "s-shaped" galleries cut on the inside of the bark. The tree quickly dies from the girdling action and blue stain fungus. The final sign of attack and the sure mark of death for the tree is a fade in needle color from green to yellow to red.

After the eggs hatch, small white grubs (larvae) feed in the inner bark, soon turning into pupae and then new adults. In just 30-35 days in the summer, the new brood emerges and flies to other trees to repeat the cycle. The southern pine beetle attacks all species of pine, but prefers loblolly and shortleaf.

What Can You Do to Keep Your Forest from Falling Prey?

You certainly do not have to stand by and watch your pines be killed by southern pine beetles. The key is in prevention rather than addressing the problem after it occurs! One of the most widely used programs is hazard rating.

The goal is to identify pine stands growing under conditions preferred by the beetle. These high-hazard stands should be managed to favor vigorous tree growth and to promote natural resistance to beetles.

You can assure long-term protection from southern pine beetles by taking these precautionary measures:

1. Hazard rate pine stand to assess susceptibility.
2. Manage high hazard stands to increase tree growth and reduce risk.
3. Detect and control active infestations when they occur.

Hazard rating provides a basis for scheduling thinning or other preventative treatments. It also aids in setting control priorities should an outbreak occur. Timber losses can be reduced during outbreaks by controlling infestations in order of priority, based on hazard, tree value and level of beetle activity.

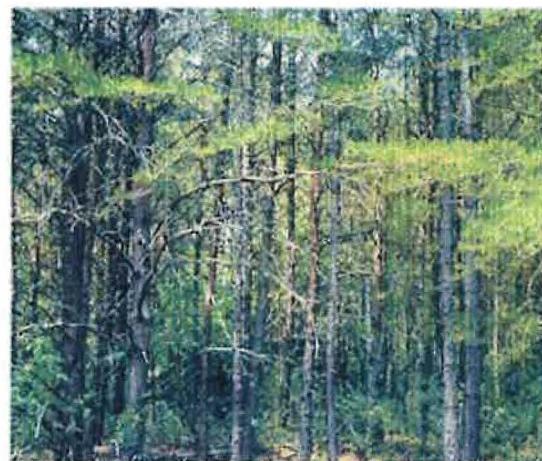
Several different rating systems have been developed for different areas throughout the South. After two years of data collection and analysis by Mississippi State University, one system was determined to be best for Alabama. This system, called the Mississippi-Alabama System, can be applied only to loblolly and shortleaf pine.

First, to rate a pine stand using this system you need information on pine basal area (BA), total basal area, stand age, and site index. Pine basal area is a measurement of the number of square feet of pine per acre. Generally, the higher the BA the higher the hazard. Total basal area is a measurement of the number of square feet of all trees per acre. Generally, the higher the percentage of hardwood the lower the hazard. Stand age is the average age of the stand. This is usually measured by using an increment borer. Site index is a measurement of the height pines will grow on a particular site in 50 years.

Second, this information is taken at each plot, with plots generally 330 feet apart or at the same interval used in taking other forest management measurements. Third, this information is put into a formula to determine the score. The score is then associated with a hazard class (see box).

How to Reduce the Risk

There are several things you can do to reduce the risk of southern pine beetles. One, thin to reduce the pine density to basal areas of 70-100 ft.²/acre. This will promote rapid tree growth as well as resistance to beetles. On sandy soils use borax on stumps to prevent annosus root rot. Low thinning or "thinning from below" is recommended to reduce competition and to remove slow-growing trees, which are mostly subject to SPB attack. The poorer crown classes—suppressed and intermediate trees—are cut first. Dominant and co-dominant trees with large live crown ratios and desirable phenotypic traits (overall appearance) should be favored as crop trees. They are most likely to respond to thinning and to provide the greatest number of silvicultural options in the management of residual stands.



Two, harvest and regenerate over mature stands. Susceptibility of trees to SPB attack increases with age. Mature and over mature trees usually have slower radial growth, flat-topped crowns, and sparse foliage. These trees seldom respond to intermediate cuttings, and should be replaced with the most resistant host

species or a species mix suited to the area.

Three, reduce competition from hardwoods or suppressed pine by using prescribed fire or herbicides. Prescribed burning should be considered as a pest management practice. Burning can be used to eliminate suppressed high-hazard trees from overstocked stands. Stand vigor will be further increased by reducing competition from understory hardwoods and vegetation. Prescribed burning before and after thinning also reduces severity of annosus root rot in the South.

Prescribed use of fire, as opposed to wildfire, does not increase SPB activity. It can be a useful tool in reducing losses from pests. Pine release herbicides can be used to control competition from unwanted hardwoods and vegetation. Care should be taken in order to select the proper herbicide for the site to ensure the residual pines are not damaged.

Four, remove high-hazard trees. Every stand has some damaged or weakened trees that are highly susceptible to SPB attack. This damage can result from lightning, logging, ice, or other destructive agents. Susceptibility is greatest immediately following damage and tends to decline with time.

There is a proven interaction between southern pine beetle infestation and annosus root rot. When considering prevention by the use of hazard ratings, collect data on both the beetle and annosus rating at the same time. Recommendations to lower southern pine beetle hazards through thinning should always take into consideration annosus root rot potential.

Every landowner should know that prevention doesn't cost—it pays in the form of more valuable timber, less mortality, and the satisfaction of knowing that you are managing your forest to benefit not only yourself, but generations to follow. Through Integrated Pest Management you can turn an unmanaged forest into a TREASURE.

The formula to determine hazard rating:

$$\text{Score} = 1.8342 \text{ (Pine BA)} + 0.4085 \text{ (Total BA)} + 0.705 \text{ (AGE)} + 0.88 \text{ (Site Index)} - 206.315$$

220 = Very High
168 - 219 = High
62 - 167 = Medium
11 - 61 = Low
10 = Very Low

Example: If a stand has a total basal area of 130 ft.²/ac., pine basal area of 110 ft.²/ac., stand age of 27 years and a site index of 109, the relative hazard would be determined as follows:

$$\text{Score} = (1.8342 \times 110) + (0.4085 \times 130) + (0.705 \times 27) + (0.88 \times 109) - 206.315 = 163.51$$

The score of 163.51 falls between 62 and 167. The relative hazard rating would be "Medium."

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